

Family Name:

Other Names:

ID Number:

COMP 102: Term Test

Model Solutions

15 September, 2009

Instructions

- Time allowed: **45 minutes**
- There are 45 marks in total.
- Answer **all** the questions.
- Write your answers in the boxes in this test paper and hand in all sheets. You may ask for additional paper if you need it.
- If you think some question is unclear, ask for clarification.
- Brief Java documentation will be supplied with the test.
- This test will contribute 15% of your final grade, if it helps your grade.
- Non-electronic translation dictionaries and calculators without a full set of alphabet keys are permitted.

Questions

Marks

1. Basic Java

[19]

2. Define a method

[9]

3. Two class programs

[8]

4. Debugging: Files

[9]

TOTAL:

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

Question 1. Basic Java

[19 marks]

(a) [5 marks] Consider the method definition below.

```
public void farenToCent(int faren){  
    int cent = (faren - 32) * 5 / 9;  
    System.out.println(faren + "F -> " + cent + "C");  
}
```

(i) [1 mark] What is the name of the method being defined?

(ii) [1 mark] What is the type of the parameter?

(iii) [1 mark] What is the name of the variable of type *int*?

(iv) [1 mark] How many assignment statements are in the method?

(v) [1 mark] Does this method return any value?

(b) [4 marks] Consider the following printLabels method which will prompt the user for some values and print something out.

Hint: draw boxes for each variable and keep track of the value put in it.

```
public void printLabels(){
    Scanner scan = new Scanner(System.in);
    System.out.println("Enter ID number and name: ");
    int code = scan.nextInt();
    String name = scan.nextLine();

    System.out.println("Enter address: ");
    String st = scan.nextLine();

    System.out.println("Courier:");
    System.out.println(name);
    System.out.println(st + " NZ");

    System.out.println("Attn:");
    System.out.println("Name: " + code);
    System.out.println("City: " + st);
}
```

What will the method print out if the user typed the following answers to the two prompts:

```
Enter ID number and name: 300012345 Allan
Enter address: 23 Homewood Road
Courier:
Allan
23 Homewood Road NZ
Attn:
Name:300012345
City:23 Homwwood Rd
```

(c) [4 marks] Consider the following printChoice method

```
public void printChoice(int x){
    if (x < 10) {
        x = x * 5;
        System.out.println("Choice 1: " + x);
    }
    if (x < 15) {
        x = x + 1;
        System.out.println("Choice 2: " + x);
    }
    else if (x >= 15){
        x = 25;
        System.out.println("Choice 3: " + x);
    }
    System.out.println("x is updated: " + x);
}
```

(i) [1 mark] What will be printed if printChoice(20) is called?

```
Choice 3: 25
x is updated: 25
```

(ii) [1 mark] What will be printed if printChoice(2) is called?

```
Choice 1: 10
Choice 2: 11
x is updated: 11
```

(iii) [2 marks] What will be printed if printChoice(6) is called?

```
Choice 1: 30
Choice 3: 25
x is updates: 25
```

(Question 1 continued)

(d) [2 marks] What will the following fragment of Java print?

```
int i = 2;
while ( i < 50) {
    i = i * 2;
    System.out.print(i + " , ");
}
System.out.println( "done ");
```

```
| 4, 8, 16, 32, 64, done
```

(e) [4 marks] Write a fragment of Java that will print out all the even numbers from 10 to 1000 (inclusive), like the following:

```
10
12
14
16
:
```

```
int k = 10;
while ( k<=1000 ){
    System.out.println(k);
    k = k+2;
}
or for( int k=10; k<=1000; k++){
    if (k%2==0) {
        System.out.println(k);
    }
}
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

Question 2. Define a method

[9 marks]

Complete the following findMax method to return the maximum number from a sequence of integers. This method should prompt the user to enter a number and then read the number in using a Scanner. It should keep doing this until the user enters "quit" (or anything that is not a number). It should then return the largest of all the numbers that were entered.

```
public int findMax(){  
    System.out.print("Enter a number:");  
    Scanner sc = new Scanner(System.in);  
    int max = Integer.MIN_VALUE;  
    while(sc.hasNextInt()){  
        int x = sc.nextInt ();  
        if (x > max){  
            max = x;  
        }  
        System.out.print("Enter a number: ");  
    }  
    return max;  
}
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

Question 3. Two Class programs

[8 marks]

Consider the `MyBalloon` class on the facing page that represents a balloon (circle) on the screen that can expand and move.

Complete the following `playBalloonGame` method so that it uses the `MyBalloon` class to put two balloons on the screen at positions (100,100) and (300,100) respectively. It should then repeatedly make the first balloon expand by 1 and the second balloon move 2 steps to the right. Each balloon should be expanded/moved and shown 50 times.

```
public void playBalloonGame (){
    JFrame frame = new JFrame("Balloon Game");
    DrawingCanvas canvas = new DrawingCanvas();
    frame.setSize(600, 400);
    frame.getContentPane().add(canvas, BorderLayout.CENTER);
    frame.setVisible (true);

    MyBalloon b1 = new MyBalloon(canvas, 100, 100);
    MyBalloon b2 = new MyBalloon(canvas, 300, 100);
    int count = 0;
    while (count<50){
        b1.expand(1);
        b2.move(2, 0);
        try {Thread.sleep(500);} catch (Exception e) {}
        count++;
    }

}
```

(Question 3 continued on next page)

(Question 3 continued)

```
import comp100.*;
```

```
public class MyBalloon{  
    // Fields  
    private DrawingCanvas canvas;  
    private int radius = 5;  
    private int centerX, centerY;  
    private Color color = new Color((float)Math.random(),(float)Math.random(),(float)Math.random());  
  
    // Constructors  
    public MyBalloon(DrawingCanvas c, int x, int y){  
        this.centerX = x;  
        this.centerY = y;  
        this.canvas = c;  
        this.draw();  
    }  
  
    public void draw(){  
        this.canvas.setColor(color);  
        this.canvas.fillOval (this.centerX-this.radius, this.centerY-this.radius,  
                             this.radius*2, this.radius*2);  
    }  
  
    public void expand(int step){  
        this.radius = this.radius + step;  
        this.draw();  
    }  
  
    public void move(int stepX, int stepY){  
        this.canvas.clearRect(this.centerX-this.radius, this.centerY-radius,  
                             this.radius*2+1, this.radius*2+1, false);  
        this.centerX = this.centerX + stepX;  
        this.centerY = this.centerY + stepY;  
        this.draw();  
    }  
}
```

Question 4. Debugging: Files

[9 marks]

Suppose the file called `data.txt` contains the text:

```
4 equals 2 plus 2
3 frogs have 12 legs
8 children laughed
```

(a) [6 marks] What will the following fragment of Java print?

```
try{
    Scanner sc = new Scanner(new File("data.txt"));
    int num=0;
    while (sc.hasNext()){
        if (sc.hasNextInt()){
            num = sc.nextInt() + num;
        }
        String token = sc.next();
        System.out.print(token+" ");
    }
    System.out.println ();
    System.out.println ("num = " + num);
    sc.close ();
} catch(IOException e){System.out.println("Error while scanning"+e);}
```

```
4 equals plus 3 frogs have legs children laughed
num = 28
```

(b) [3 marks] Give an example of a file which would cause the above java fragment to crash.

```
There are 5
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.